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of the Institute will consist of Memoirs, which will contain papers more exhaustive in their character than those published in the Journal, which is to contain abstracts of the records of the meetings, the shorter papers and such translations and miscellaneous matter as the committee think worth printing.

The character of the new society promises to be such that only pure anthropological science will be allowed entrance to its meetings, and the list of present officers indicates that its objects will be fulfilled. One of the duties of the president of the society is to give a review of the progress of Anthropological Science during the year, and with Mr. Squier in the chair we look forward to an important contribution as the first annual address.

The present number contains the proceedings consequent to the organization of the Institute, with its Constitution, By-laws etc., and several papers.*

Taken all together we do not know when we have sat down to a pamphlet and read every page with greater interest and satisfaction derived from the knowledge attained, than we experienced while reading the first number of this Journal. We shall make extended quotations in future numbers of the NATURALIST.

BOTANY.

ON UTILITY IN THE SUPERABUNDANCE OF SEEDS AND POLLEN.— In the vicinity of Pike's Peak last summer I noted that *Pinus edulis*, in many instances, had its usually two "leaves" united into one. As winter approaches the terete branchlet, as I call these "needles," divides and exposes the two inner faces. Thus the one year branchlet is terete; when two or more years old the "leaves" are in twos or threes. The trees in this monophyllous condition grow as well, and as far as can be seen, are in as favorable circumstances to engage in the struggle for life as any Pine can be, whether with one, two, or five leaves, and this too though the inner or, as we would say of true leaves, the upper surfaces, so essential to most plants, do not exist during the growing time.

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*The Progress of Anthropology in Europe and America; a translation, by W. L. Roberts, of Dr. Broca's address before the Anthropological Society of Paris. A review of Von Martius' paper on some points of South American Ethnology, by Charles Rau. Antiquities from the Guano or Huana Islands of Peru, with illustrations, by E. G. Squier. Sculptured Rocks, Belmont Co., Ohio, with illustrations, by W. Ward. Canoe in Savannah River Swamp, with cut, by C. C. Jones, jr. Notes on Trepanning among the Incas, by M. Broca, Dr. Nott, Dr. Draper and Mr. Squier. Followed by miscellaneous matter from various sources, containing Mr. Squier's remarks on the "Arch in America," a letter from Father Mengarini on the Indians of Oregon. Notes and anthropological items from all countries.

In my recent paper on Cotyledons (" Proceedings American Association," Indianapolis) I noted that the usually pluri-cotyledonous *Abies excelsa* frequently has but three, and at times but two seed lobes. The number of lobes does not seem in the slightest degree to aid the individual or to exert any influence whatever on the preservation of species.

The trees and shrubs of Europe mostly bear seeds more profusely than closely allied American species. *Quercus robur*, commences to bear acorns when ten years old. It then bears annually. *Quercus alba*, the American white, rarely fruits till fifteen or twenty, and then seldom leaves but every other year, although generally more prolific than any other North Eastern American oak. It never approaches in profusion the best specimens of the English species.

Liriodendron tulipifera appears to have an abundance of pollen, so far as an examination of its numerous flowers indicates. The seeds are distributed by a light wing. The immense majority of the distributed carpels are seedless.

In the Pine family the pollen is in immense profusion. If we climb into a tree just as the pollen sacs are bursting, our clothes are as yellow as if turned out of a mustard bag.

Many observations of a similar character must have been made by every botanist.

At page 183 of this journal, 1871, I said we may say of pollen or of seeds themselves, that "nature makes numberless things for which she has no use whatever. Perhaps it may be, that like the human mind, the mind of nature likes variety and profusion, in the effort for which mere utility is not always consulted." The editors remark—" and of this sort pollen and seeds are queer examples. Does he mean that these are useless because superabundant enough to ensure against risk and loss, and appropriation by animals through which fertilization and dispersion are subserved?"

It does seem to me that no utility is subserved by the division of Pine leaves or of cotyledons; nor in a large number of cases which might be cited as to the mere form of plant structure. In the case of the oak, and other similar instances the American species holds its own against all losses as well as its English brother;

and doubtless would if it only fruited every ten years instead of every two, and especially when we see the Liriodendron with most of its seeds infertile and yet very widely distributed, must we not regard the profusion of English seed useless?

And in regard to the pine pollen, certainly after granting the widest margin for "insurance against all losses," the vast proportion is useless so far as any benefit to the individual or species is directly concerned.* If we regard pine pollen as produced by nature for the purpose not of fertilization merely, but for the purpose of forming coal also (see Huxley on coal), it would suit a popular idea of utility in nature. But the coal formed out of deposits of pollen from Sigillarias and Lepidodendrons, serves no purpose to these plants.

It was in this sense that I meant the over production useless; and in this sense I suppose I should differ from much in modern philosophy, which, as I understand it, seeks in *every production* of life a benefit to the parent which produced it. Yet in one sense the production may not be regarded as useless. A boy whittles a stick, the shavings are of no benefit to him. But the activity which produced the shavings is a power in boy life, other things he does which aid both in the purpose and in the results. He gathers apples. The action serves him, and the result is food for action in the future.

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*In reaffirming our bit of criticism which Mr. Meehan fails to see the point of, it is best to keep the point clear from all heterogeneous matters (such as the nature of pine-leaves and of cotyledons, in respect to which Mr. Meehan's views are very peculiar), and stick to the case of the abundance of pine-pollen, vast in itself and in proportion to the seeds to be fertilized. This excess of pollen Mr. Meehan adduces in proof of the proposition "that Nature makes numberless things for which she has no use whatever." But—to continue the personification—before he condemns Dame Nature for wasteful profusion, let him consider, as she had to do, the conditions of the particular case in hand; viz., a species of tree with flowers of separate sexes, destitute of honey or other enticement for insects, and therefore to be fertilized by the wafting of pollen by the wind, and in view the advantage of wide breeding. Can he be quite sure that there is a wasteful excess of pollen here; and does he not see that, at least, this is not a convincing argument "that nature makes numberless things for which she has no use whatever?"

Now, while we plead "extenuating circumstances" in behalf of Dame Nature in this particular case, it may be allowable to bring testimony to her general good character for economy where no purpose is to be served by profusion. Take the case of those surely fertile little blossoms of Impatiens (referred to on page 109 of this number), or the similar flowers of violets, Specularia, and the like, where nature means close fertilization, and therefore shuts up anthers and stigma together, and endows the pollen grains with the power to send out their tubes from the one to the other—so dispensing with wind, insects, or other carriers—here a superabundance of pollen might imply waste. But in these cases—and in these only—the grains of pollen do not very much exceed the number of ovules to be fertilized!

Apropos to the paucity of seeds which mature in Liriodendron, and that some oaks are much more prolific than others, but the least fertile showing no disadvantage therefrom in the struggle for life, we were disposed to explain how small a factor, comparatively, the mere number of progeny must be in the problem of natural selection. But that is best done by referring to Darwin's "Origin of Species," chapter third, especially to the paragraph in which he states that the Fulmar petrel lays but one egg, yet it is believed to be the most numerous bird in the world."—EDITORS.

To illustrate this again in plant life. We all know how much time has been given to studying the uses of thorns. What is the use of thorns to a rose. The sweet briar has a few scattered recurved thorns. But when a certain insect deposits an egg in a growing branch, the gall and a portion of stem above and below, become densely crowded with straight sharp thorns. I take it that these thorns are entirely useless to the plant, and yet the vital action which produced them no doubt served a useful purpose; and I should say the same of all the thorns on the whole plant. I suppose some might say that this echinate gall was the result of abnormal vital action, and is perhaps to be credited to the insect which was thus better protected from enemies. But how this larva is better protected by these pines I fail to see. The principle applied to the boy with the shavings seems more philosophical. The thorns are useless, but the action which produced them was not.

I have been content in the past with recording my observations, only occasionally hazarding a suggestion as to the direction in which they pointed. I feel that my field and my opportunities are too limited to allow me to put full faith in my own judgment when opposed to the views of those much better situated to decide. If in this I offer more than my usual quota of opinion, it is out of respect to the editor's inquiry.—THOMAS MEEHAN.

PLANT DRYERS.—The best article I have ever used,—better than any blotting paper—is one of the kinds of sheathing paper made by Messrs. Roberts and Son, of Waltham. In any large quantity it can be had cut to size at the mill. I have just been distributing *two tons* of it among botanists, cut to size of twelve by eighteen inches. Each sheet is like a pad of blotting paper. We stitch from three to five sheets together into a dryer, the specimens being placed between successive dryers, of course enclosed in a sheet of thin soft paper; nothing can be better, nor so cheap. The maker having a small quantity left over from our large order, I have asked the Naturalists' Agency to take it in order to supply botanists, schools, etc., in quantities smaller than can be had from the manufacturers. For price see the advertisement.—ASA GRAY.

LATE FLOWERING OF THE GIBBOUS BLADDERWORT.—This fall I found on the flats of the Charles River, *Utricularia gibba*, covering half an acre of ground in full bloom, October 2d. It continued to send up fresh flowers till cut off by a frost near the first of November. The time given in our works on botany, for expecting this little plant in flower is July and August.—WM. EDWARDS, *Natick*.

NEW AMERICAN VARIETY OF ASPLENIUM FILIX FŒMINA.—In Europe many variations of this fern are given in their manuals, the most prominent of which are vars. rhæticum, multifidum, marinum, crispum, latifolium.

None, however, have been noticed in this country previous to 1869, when several tufts were discovered growing in Wilton, N. H., bearing all the fronds thus peculiarly marked: tips of each pinna fringed with five to eight lobes, tops of fronds tasselled with a cluster of ten to fifteen pinnæ gradually diminishing in size towards the centre, fronds fifteen to twenty inches high, by five to seven wide. In 1870 and 1871 I gathered specimens from the same roots, in all respects like the first.

This variety seems identical with var. multifidum of English works, but as the specimen sent to the herbarium of Prof. Gray at Cambridge bears the name of *Asplenium filix fœmina* var. *cristatum*, it will henceforth be known by that name.—WM. EDWARDS.

INFLUENCE OF GREEN LIGHT ON THE SENSITIVE PLANT.—In order to test the effect of green light on the sensitiveness of the Mimosa, M. P. Bert has placed several plants under bell-glasses of different colored glass set in a warm greenhouse. At the end of a few hours a difference was already apparent; those subjected to green, yellow, or red light had the petioles erect and the leaflets expanded; the blue and the violet, on the other hand, had the petioles almost horizontal and the leaflets hanging down. In a week those placed beneath blackened glass were already less sensitive, and in twelve days they were dead or dying. From that time the green ones were entirely insensitive, and in four days more were dead. At this time the plants under the other glasses were perfectly healthy and sensitive; but there was a great inequality of development among them. The white had made great progress, the red less, the yellow little less still; the violet and the blue did not appear to have grown at all. After sixteen days the vigorous plants from the uncolored glass were removed to the green; in eight days they had become less sensitive, in two more the sensitiveness had almost entirely disappeared, and in another week they were all dead. Green rays of light appear to have no greater influence on vegetation than complete absence of light, and M. Bert believes that the sensitive plants exhibit only the same phenomena as all plants colored green, but to an excessive degree.—A. W. B.

STRUCTURE OF THE CLOSED FLOWERS OF IMPATIENS.—At a meeting of the Linnæan Society of London held November 16th, Mr. A. W. Bennett read a paper on the above subject, his observations, made on *Impatiens fulva* Nutt., an American species completely naturalized in several places in the south of England, being substantially in accordance with those recorded by Prof. Asa Gray in his "Genera Flora America boreali-orientalis." Mr. Bennett, however, believes that the closed or "cleistogenous" self-fertilized flowers are not the result of "arrested development," but are from the first of a different nature, and he suggests that the "cap" formed by the unexpanded calyx and corolla may be thrown off the pistil by the elasticity of the stamens, which are of a very different shape and structure from those in the perfect flowers. The anthers do not dehisce, but the pollen, the quantity of which is very small, pierces with its tubes the wall of the anther in order to reach the stigma. The plant does not appear to be visited by insects in England; the conspicuous flowers, in which there is a provision to prevent the pollen reaching the stigma consequently seldom produce pods, while the unopened flowers do so abound invariably.—A. W. B.

ZOOLOGY.

THE ETHEOSTOMOIDS.—Having been for several years specially interested in this little group of Percoids, of which I am now engaged in completing a monograph, and wishing to secure